COMPONENT VALUES

AMPLIFIER

Resistors	Value	Tolerance	Rating	Type
R1	4·7K	10%	¼ watt	Carbon
R2	1megohm	10%	¼ watt	Carbon
R3	1·2K	10%	¼ watt	Carbon
R4	220ohms	5%	¼ watt	High Stability
R5	220K	10%	¼ watt	Carbon
R6	1megohm	10%	¼ watt	Carbon
R7	1K	10%	¼ watt	Carbon
R8	47K	5%	¼ watt	Carbon
R9	47K	5%	¼ watt	Carbon
R10	470K	10%	¼ watt	Carbon
R11	470K	10%	¼ watt	Carbon
R12	22K	10%	¼ watt	Carbon
R13	22K	10%	¼ watt	Carbon
R14	130ohms	5%	1 watt	Carbon
R15	6·8K	5%	¼ watt	High Stability
R16	5·6K	10%	1 watt	Carbon
R17	470ohms	10%	1 watt	Carbon
R18	2·2ohms	10%	~~1 watt Wire Wound~~ 1 watt carbon	

Capacitors	Value	Rating	Type	Tolerance
C1	40mfd	16V	Electrolytic	—
C2	·022mfd	400V	Polyester	10%
C3	1000pF ~~400pf~~	350V	Polystyrene	10%
C4	·1mfd	400V	Polyester	10%
C5	·1mfd	400V	Polyester	10%
C6	40mfd	16V	Electrolytic	—
C7	330pF ~~680pf~~	350V	Polystyrene	10%
C8	16mfd	350V	Electrolytic	—
C9	16mfd	350V	Electrolytic	—
C10	100mfd	275V	Electrolytic	—
C11	100mfd	275V	Electrolytic	—
C12	6·8pF		Ceramic	

Valves
V1 a/b ECL86
V2 a/b ECL86

Silicon Rectifiers
MR1/MR2 BY114

Fuses
F1 ½A. 1¼" glass cartridge pattern. Anti-surge.
F2 1A. 1¼" glass cartridge pattern. Anti-surge.
(110V Range 2A.)

CONTROL UNIT

Resistors	Value	Tolerance	Rating	Type
R1	470K	5%	¼ watt	High Stability
R2	820K	5%	¼ watt	High Stability
R3	2·2K	5%	¼ watt	High Stability
R4	220K	5%	¼ watt	High Stability
R5	33K	5%	½ watt	High Stability
R6	8·2megohm	10%	½ watt	Carbon
R7	270 ohms	5%	¼ watt	High Stability
R8	2·2K	5%	½ watt	High Stability
R9	100K	10%	½ watt	Carbon
R10	470K	10%	½ watt	Carbon
R11	100K	10%	½ watt	Carbon
R12	100K	10%	½ watt	Carbon
R13	330K	10%	½ watt	Carbon
R14	270K	10%	½ watt	Carbon
R15	270K	10%	½ watt	Carbon
R16	100K	10%	½ watt	Carbon
R17	22K	10%	½ watt	Carbon
R18	10K	10%	¼ watt	Carbon
R19	1K	5%	¼ watt	High Stability
R20	1·5MΩ	10%	¼ watt	carbon
R21	330KΩ	10%	¼ watt	carbon
R22	1·8MΩ	5%	¼ watt	High Stability
R23	1·8MΩ	5%	¼ watt	High Stability
R24	220Ω	10%	¼ watt	Carbon

Capacitors	Value	Rating	Type	Tolerance
C1	40mfd	16V	Electrolytic	—
C2	·022mfd	400V	Polyester	10%
C3	40mfd	16V	Electrolytic	—
C4	·1mfd	400V	Polyester	10%
C5	680pf ~~400pf~~	400V	Polystyrene	10%
C6	4700pf	400V	Polyester	10%
C7	100pf	400V	Polystyrene	5%
C8	1200pf	125V	Polystyrene	5%
C9	1500pf	125V	Polystyrene	5%
C10	·1mfd	400V	Polyester	10
C11	·047mfd	160V	Polyester	20%
C12	16mfd	350V	Electrolytic	—%
C13	16mfd	350V	Electrolytic	—
C14	~~100mfd~~ 125μF	4V	Electrolytic	—

Potentiometers C15 ·022μF 250V A.C. Pole

RV1	Dual	1 megohm	LIN
RV2	Dual	500K	LIN Centre Tapped
RV3	Dual	250K	LOG + Switch
RV4	[redacted]	1K	LIN

Dial Bulb
LP1 8V. ~~1W~~ 1·2W. L.E.S.

Valves
V1 a/b ECC 807
V2 a/b ECC 807

IMPORTANT: Save the carton together with all fittings in case it may be necessary to return the unit for service. If this does prove necessary, great care should be taken in packing so as to minimise the possibility of damage being sustained in transit. Any transit damage resulting from inadequate packing will not be covered by our Guarantee nor will it be covered by the Carriers. Where possible we recommend that equipment be returned by Passenger Train at Company's Risk.

ROGERS

THE CADET MARK THREE

STEREO AMPLIFIER and CONTROL UNIT

CADET MK. III STEREO AMPLIFIER AND CONTROL UNIT
INSTALLATION AND OPERATION INSTRUCTIONS

We recommend that these Instructions be read fully and carefully before any attempt is made to connect up, or use the equipment.

MAIN AMPLIFIER

(1) Insert the four ECL86 valves in their holders, taking care not to bend the pins and ensuring that they seat correctly.

(2) Set the Mains Voltage Selector to the appropriate supply voltage. When the supply voltage falls between two tappings always use the higher tapping, i.e. Supply Voltage 230V use 240V tap.

(3) Connect the loudspeaker leads to the appropriate pair of terminals on the 6-way terminal strip at the back of the chassis. The two centre terminals, i.e. those marked 'O' may also be used as an EARTH connection.

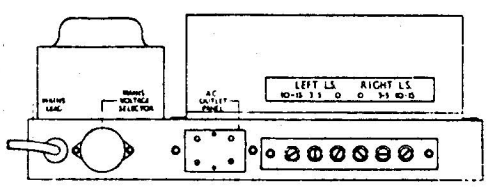
(4) Insert the multi-core connecting lead from the Control Unit into the appropriate socket on the Amplifier chassis.

(5) Connect a suitable 3-pin Mains Plug Top to the 3-core mains lead. GREEN—EARTH. RED—LIVE. BLACK—NEUTRAL.

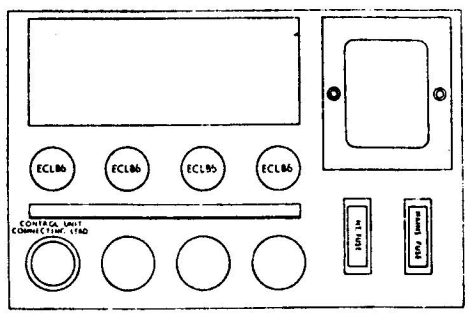
(6) For convenience the A.C. power for a gramophone motor, or other piece of auxiliary equipment, may be taken from the dual A.C. Outlet Socket at the rear of the amplifier chassis. These sockets are 'Live' irrespective of whether the amplifier is switched on or not.

(7) Two fuses are fitted to the amplifier protecting the mains primary and H.T. circuits. If the equipment fails to light up when switched on check the mains fuse for continuity, if the equipment lights up but there is no signal then check the H.T. fuse.
Ratings:— MAINS FUSE 1¼" glass cartridge. 1A anti-surge. (110V range-2A.)
H.T. FUSE 1¼" glass cartridge. ½A anti-surge.

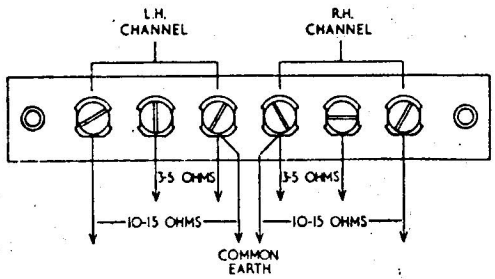
(8) The amplifier is secured in a cabinet by means of three 4 B.A. bolts screwed into the hank bushes on the amplifier chassis from underneath (See Template). In the case of the Integrated Model the case is freestanding and it is simply necessary to ensure that the ventilation grille is not obstructed in any way.



REAR VIEW



PLAN VIEW



◀ LOUDSPEAKER CONNECTIONS

CONTROL UNIT

Method of Mounting. First provide a cut-out in the cabinet as per template. Place the unit in position from the front of the cabinet and secure by means of the two small wood screws provided. Fix the Front Panel in position securing by means of the fixing screw and $\frac{3}{8}$" brass nuts on the bushes of the BALANCE, TREBLE and VOLUME Controls. Secure the four control knobs making sure that the pointers correspond with the appropriate markings on the panel. Any panel thickness can be accommodated.

Input Connections. All input connections are via standard miniature phono sockets located at the rear of the Unit. Good quality low-loss, screened flex with an insulated outer covering must be used for all input connections; the braiding is soldered to the body of the phono plug provided, the centre conductor to the centre pin of the plug.

INPUT	SELECTOR	CHARACTERISTIC	SENSITIVITY	IMPEDANCE
DISC	DISC (SILVER ADAPTOR)	FLAT	65 m/v	2megohm
DISC	DISC (GOLD ADAPTOR)	RIAA	3·8 m/v	68K
TUNER	TUNER	FLAT	100 m/v	470K
TAPE REPLAY	TAPE	FLAT	600 m/v	—

DISC. The Disc Inputs are suitable for either magnetic or ceramic pick-up cartridges. The sensitivity and characteristics of the disc input are determined by the plug-in Pick-up Adaptor used, which should be inserted in the appropriate socket at the side of the Control Unit. Choose the ADAPTOR appropriate to the pick-up being used by reference to the list below. A GOLD and SILVER ADAPTOR are supplied as standard with each Control Unit and will be found to match the majority of magnetic and ceramic cartridges likely to be encountered.

Colour Code *GOLD* (low output magnetic cartridges) suitable for:— DECCA FFSS Series: SHURE M7D, M8D, M44, M55 Series: TANNOY Varitwin MK II: NEAT: EMPIRE 108: GOLDRING 580, 600, 700: EAGLE GOLD M1007G: PHILIPS AG 3021, AG 3401, AG 3402: ADC 660, 770, Point-Four, Point-Four E.

Colour Code *SILVER* (low output ceramic cartridges) suitable for:— BSR C1: DECCA Deram: GARRARD EV26A: N. MIERS C1: SUGDEN SCU1 Series: GOLDRING CS90.

Colour Code *RED* (high output crystal and ceramic cartridges) suitable for:— ELAC KST-102—103—103D—106: ELECTRONIC REPRODUCERS ER60, ER710, ER715: GARRARD GC3: SONOTONE 9TA: GOLDRING CS80, SX10L, CM60.

Colour Code *GREEN* (high output crystal cartridges) suitable for:— BSR SX1M, XIM, FUL-F1 TC8 M: ELECTRONIC REPRODUCERS ER703: GARRARD GC2: GOLDRING MX2L.

Colour Code *ORANGE* (low impedance crystal) suitable for:— PHILLIPS AG-3060—3063—3301—3304—3305—3306—3310.

Colour Code *BLUE* (high output magnetic) suitable for:— EAGLE SILVER M1007F: ELAC MST1, STS222D: LEAK DYNAMIC: ORTOFON SPUGT: SHURE MD5, M65: CONNOISSEUR MK II L.P.

When connecting the pick-up lead on no account should the braiding be earthed to the motor or main amplifier. A solder tag is provided at the rear of the Control Unit for earthing pick-ups having a separate earth wire.

A monaural pick-up should be connected to the left-hand input channel then, with the Stereo/Mono Button 'Out', output will appear at both loudspeakers. With the Stereo/Mono button 'In', output will be obtained at the left-hand loudspeaker only.

When using a compatible stereo pick-up to play a monaural record, the stereo/mono button should be in the 'Out' position, the pick-up outputs will then be connected in parallel and output will again appear at both loudspeakers.

For normal stereo operation, i.e. using a stereo pick-up to play a stereo record the stereo/mono button should be 'In'.

TUNER

Dual radio inputs are provided suitable for the connection of the majority of AM, FM and FM Stereo Multiplex receivers. Output from a monaural receiver should be connected to the left-hand input channel then, with the stereo/mono button 'Out', output will appear at both loudspeakers.

TAPE

[illegible] Pattern Panel Socket is provided for the connection of a complete Tape Recorder. The socket includes Record and Replay connections for both channels, numbering conforming to standard DIN practice. All four connections are duplicated at the rear of the unit via miniature phono sockets to facilitate 'built-in' tape installations.
Connections to the Panel Socket are as follows:—

Connections to the Tape Panel Socket are as follows (for socket numbering see circuit diagram):

(1) Tape Replay Channel A.

(2) Earth.

(3) Tape Record Channel A.

(4) Tape Replay Channel B.

(5) Tape Record Channel B.

TO RECORD. Whatever programme source is selected will appear at the RECORD sockets and will be unaffected by VOLUME, TONE or FILTER settings. Recording level will be adjusted by means of the level control on the Tape Recorder. The record signal will be present whether or not the TAPE Button has been depressed. We must emphasise that the record signal is not suitable for feeding direct to tape record heads, a 'Tape Deck' alone is therefore not sufficient and a complete Tape Recorder incorporating a record amplifier and bias oscillator is essential. To mute the loudspeakers while recording, the TAPE Button should be depressed.

TO REPLAY. To replay, the TAPE Button should be depressed and output from the Tape Replay sockets on the Tape Recorder taken to the replay connections on the Control Unit. With Tape Recorders having a separate replay head, monitoring of the recorded signal is possible.

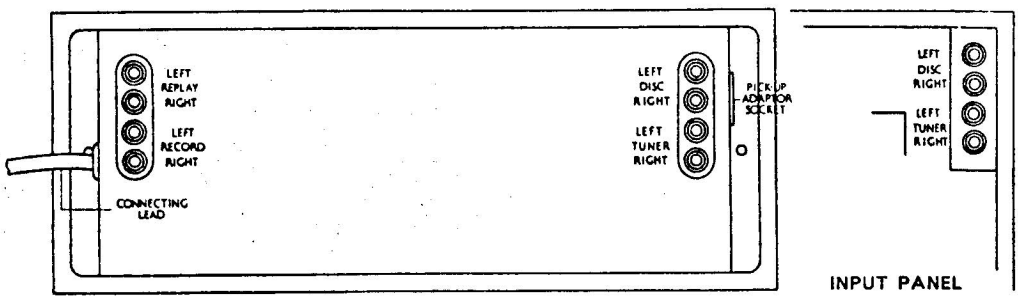
AVOIDING HUM

With no inputs connected the unit will be found to have a very low noise level; if there is any substantial increase in hum level when the pick-up or other piece of auxiliary equipment is connected, then this indicates incorrect assembly and/or wiring of the auxiliary equipment concerned. When trouble from hum is experienced the following points should be checked.

(1) The mains transformer on the amplifier should be located at least 18" away from magnetic pick-ups and tape heads, otherwise induced hum may result.

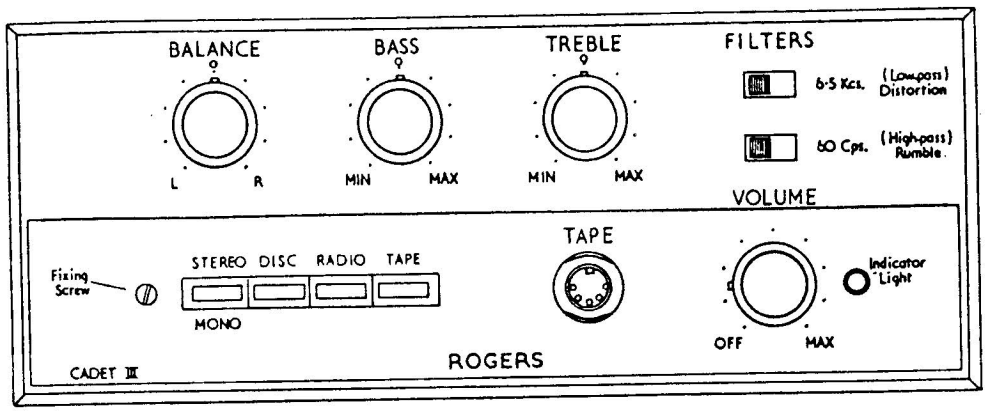
(2) Check the screening of the pick-up lead; on no account should the braiding be earthed to the amplifier or the motor, or allowed to touch the motor plate, metal pick-up arms, etc. It will automatically be earthed at the input socket when the lead is plugged in.

(3) The gramophone motor should be earthed to the main amplifier by means of the terminal provided.



REAR VIEW

INPUT PANEL
CASE MODEL



CONTROL FACILITIES

INPUT SELECTOR

Four-way Push-button Switch Unit. Provides for selection of DISC, RADIO AND TAPE REPLAY. Left-hand button marked STEREO/MONO enables function to be selected, operates on DISC and RADIO inputs only. With button 'IN', stereo operation is obtained; with the button 'OUT" mono operation will be obtained, i.e. a mono signal fed into the left-hand input will appear at both loudspeakers, the right-hand input is isolated on RADIO input.

VOLUME

Dual ganged control affecting overall volume from all inputs. Has no effect on the 'Tape Record' Output. Incorporates ON/OFF switch in fully anti-clockwise position. Dial light adjacent to the Volume Control indicates when the equipment is 'ON'. On-off switch fitted with switch click-suppressors.

BASS and TREBLE

Continuously variable ganged controls employing modified Baxendall circuit. Optimum settings depend on programme material, room acoustics and personal taste. It is therefore impossible to give 'recommended settings'; a start should be made with both controls at mid position. It should not be attempted to employ a high degree of bass boost at high volume levels.

BALANCE

A vernier control having sufficient range of control (9DB) to compensate for inequalities in recordings, etc. Operates on DISC and RADIO Inputs only.

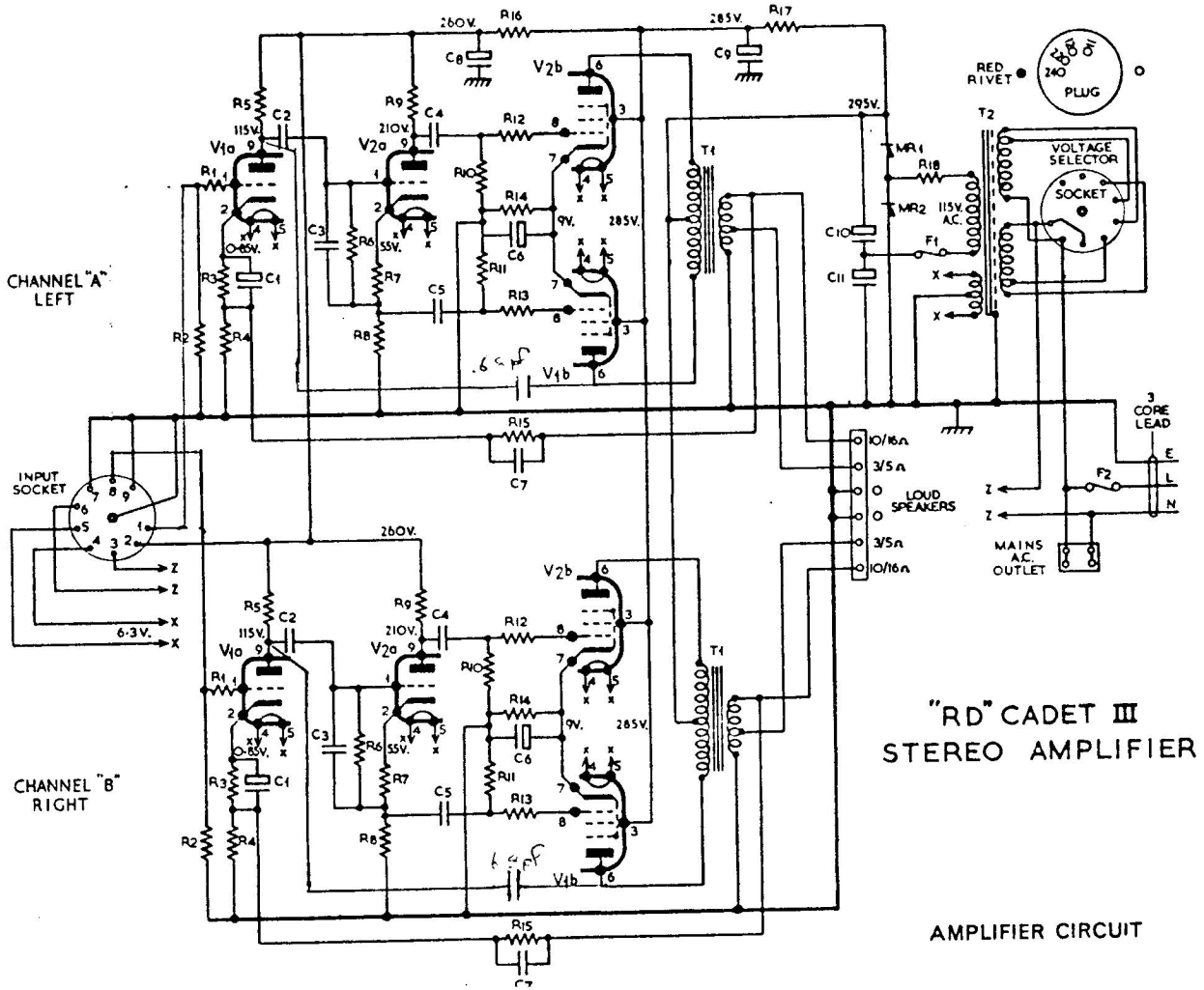
FILTERS

Switched High-pass Filter operating at 60cps used to reduce rumble which may be experienced when using other than transcription quality motor units.

Switched Low-pass Filter operating at 6·5kcs used to reduce distortion which may be experienced with poor programme material, i.e. worn records, bad radio transmissions, etc.

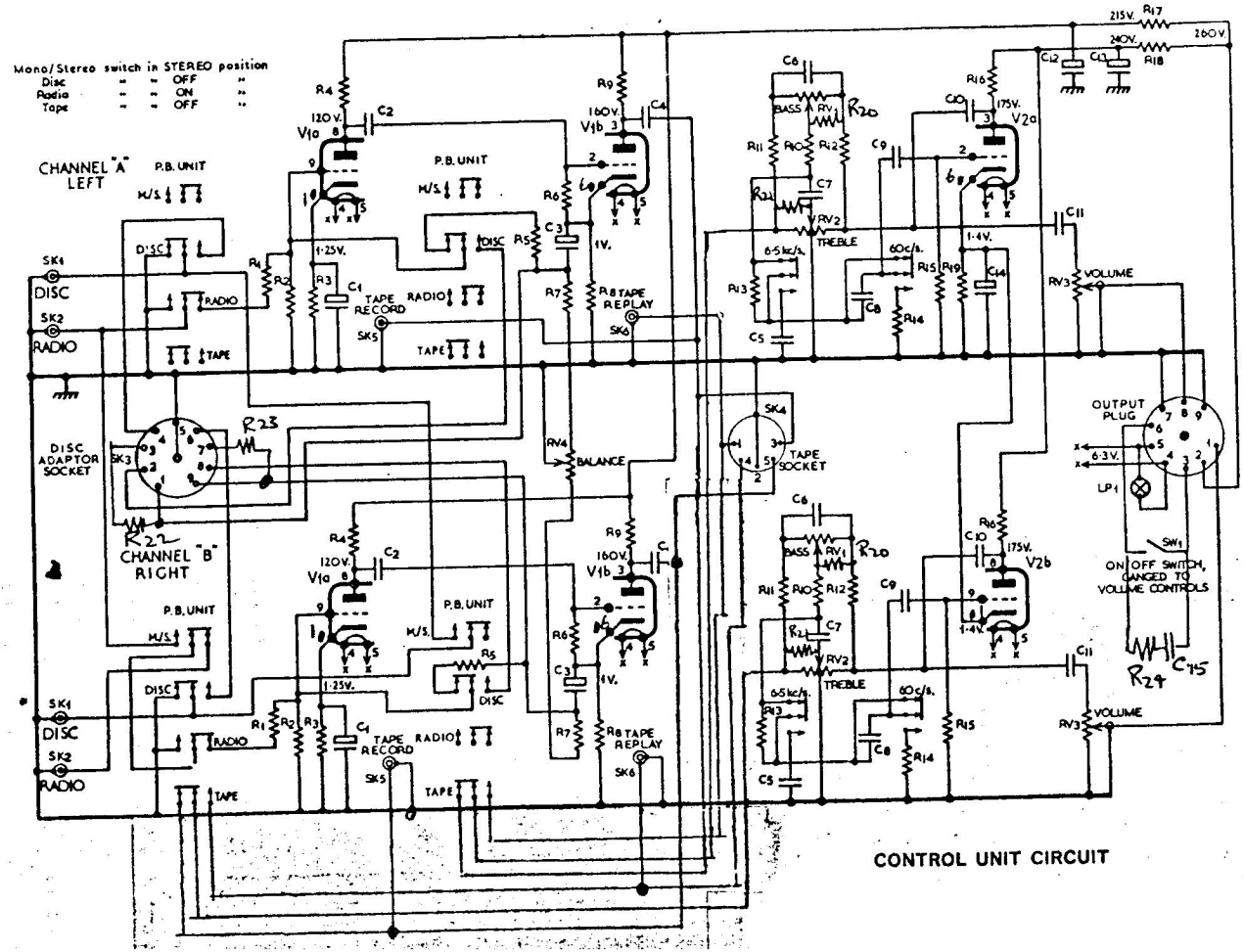
The effect of the Filters will be most apparent when using wide range associated equipment and listening to first-class programme materials with Tone Controls level or at boost settings. The effect of the Filters will be masked when Tone Controls are at cut settings, when associated equipment has restricted frequency range, or when listening to poor programme material.

Both Filters are 'IN' when the slide switches are moved to the right.

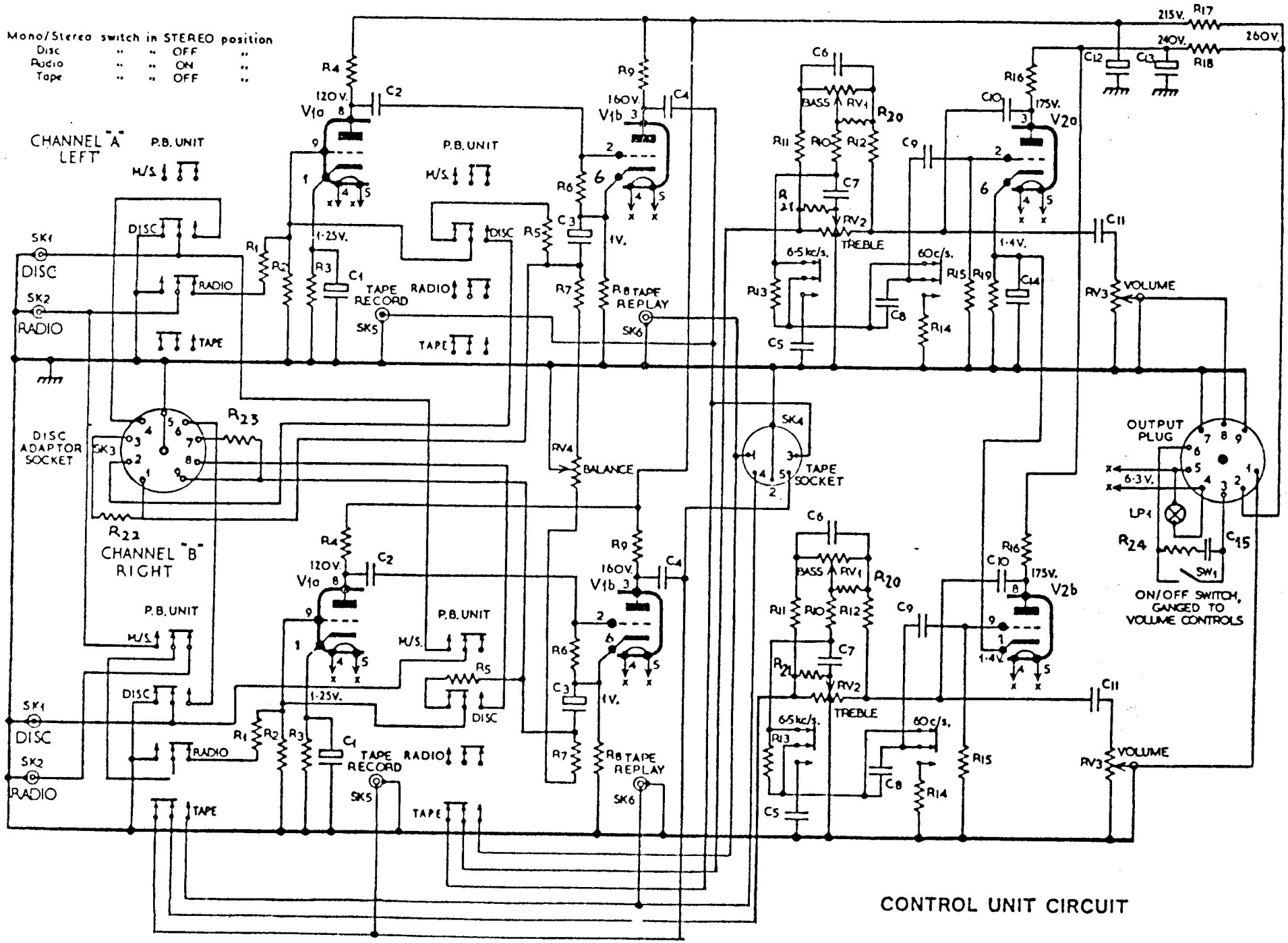


"RD" CADET III
STEREO AMPLIFIER

AMPLIFIER CIRCUIT



CONTROL UNIT CIRCUIT



CONTROL UNIT CIRCUIT

CADET III STEREO AMPLIFIER (CHASSIS MODEL)

COMPONENT VALUES

AMPLIFIER.

Resistors.	Value.	Tolerance.	Rating.	Type.
R1	4.7K	10%	¼ watt	Carbon
R2	1 megohm	10%	¼ watt	Carbon
R3	1.2K	10%	¼ watt	Carbon
R4	220ohms	5%	¼ watt	High Stability
R5	220K	10%	¼ watt	Carbon
R6	1 megohm	10%	¼ watt	Carbon
R7	1K	10%	¼ watt	Carbon
R8	47K	5%	¼ watt	Carbon
R9	47K	5%	¼ watt	Carbon
R10	470K	10%	¼ watt	Carbon
R11	470K	10%	¼ watt	Carbon
R12	22K	10%	¼ watt	Carbon
R13	22K	10%	¼ watt	Carbon
R14	130ohms	5%	1 watt	Carbon
R15	6.8K	5%	¼ watt	High Stability
R16	5.6K	10%	1 watt	Carbon
R17	470ohms	10%	1 watt	Carbon
R18	2.2ohms	10%	1 watt	Carbon

Capacitors.	Value.	Rating.	Type.	Tolerance
C.1.	40mfd	16V	Electrolytic	–
C2	.022mfd	400V	Polyester	10%
C3	1000pf	350V	Polystyrene	10%
C4	.1mfd	400V	Polyester	10%
C5	.1mfd	400V	Polyester	10%
C6	40mfd	16V	Electrolytic	–
C7	390pf	350V	Polystyrene	10%
C8	16mfd	350V	Electrolytic	–
C9	16mfd	350V	Electrolytic	–
C10	100mfd	275V	Electrolytic	–
C11	100mfd	275V	Electrolytic	–
C12	6.8pf		Ceramic	

Valves

V1a/b	ECL86
V2a/b	ECL86

Silicon Rectifiers

MR1/MR2	BY114

Fuses

F1 ½A. 1¼" glass cartridge pattern. Anti-surge.
F2 1A. 1¼" glass cartridge pattern. Anti-surge.
(110V Range 2A.)

CONTROL UNIT.

Resistors.	Value.	Tolerance.	Rating.	Type.
R1	470K	5%	¼ watt	High Stability
R2	820K	5%	¼ watt	High Stability
R3	2.2K	5%	¼ watt	High Stability
R4	220K	5%	¼ watt	High Stability
R5	33K	5%	¼ watt	High Stability
R6	8.2 megohm	10%	¼ watt	Carbon
R7	270 ohms	5%	¼ watt	High Stability
R8	2.2K	5%	¼ watt	High Stability
R9	100K	10%	¼ watt	Carbon
R10	470K	10%	¼ watt	Carbon
R11	100K	10%	¼ watt	Carbon
R12	100K	10%	¼ watt	Carbon
R13	330K	10%	¼ watt	Carbon
R14	270K	10%	¼ watt	Carbon
R15	270K	10%	¼ watt	Carbon
R16	100K	10%	¼ watt	Carbon
R17	22K	10%	¼ watt	Carbon
R18	10K	10%	¼ watt	Carbon
R19	1K	5%	¼ watt	High Stability
R20	1.5 megohm	10%	¼ watt	Carbon
R21	330Kohms	10%	¼ watt	Carbon
R22	1.8 megohm	5%	¼ watt	High Stability
				Stability
R23	1.8 megohm	5%	¼ watt	High Stability
				Stability
R24	220 ohms	10%	¼ watt	Carbon.

Capacitors.	Value.	Rating.	Type.	Tolerance.
C1	40mfd	16V	Electrolytic	–
C2	.022mfd	400V	Polyester	10%
C3	40mfd	16V	Electrolytic	–
C4	.1mfd	400V	Polyester	10%
C5	680pf	400V	Polystyrene	10%
C6	4700pf	400V	Polyester	10%
C7	100pf	400V	Polystyrene	5%
C8	1200pf	125V	Polystyrene	5%
C9	1500pf	125V	Polystyrene	5%
C10	.1mfd	400V	Polyester	10%
C11	.047mfd	160V	Polyester	20%
C12	16mfd	350V	Electrolytic	–
C13	16mfd	350V	Electrolytic	–
C14	125mfd	4V	Electrolytic	–
C15	.022mfd	250V A.C.	Polyester	

Potentiometers

RV1	Dual	1 megohm	LIN
RV2	Dual	500K	LIN Centre Tapped
RV3	Dual	250K	LOG + Switch
RV4		1K	LIN

Dial Bulb

LP1	8V.	1.2W.	L.E.S.

Valves

V1 a/b	ECC 807
V2 a/b	ECC 807

CADET III STEREO AMPLIFIER (CASE MODEL)

COMPONENT VALUES

Resistors.	Value.	Tolerance.	Rating.	Type.
R1	470Kohms	± 5%	¼ watt	High Stability
R2	820Kohms	± 5%	¼ watt	High Stability
R3	220Kohms	± 5%	¼ watt	High Stability
R4	33 Kohms	± 5%	¼ watt	High Stability
R5	8.2Megohms	± 10%	½ watt	Carbon
R6	270 ohms	± 5%	¼ watt	Carbon
R7	2.2 Kohms	± 5%	¼ watt	High Stability
R8	100K	± 5%	¼ watt	High Stability
R9	330K	± 10%	¼ watt	Carbon
R10	470Kohms	± 10%	½ watt	Carbon
R11	100Kohms	± 10%	¼ watt	Carbon
R12	100Kohms	± 10%	½ watt	Carbon
R13	270Kohms	± 10%	½ watt	Carbon
R14	270Kohms	± 10%	½ watt	Carbon
R15	100Kohms	± 10%	½ watt	Carbon
R16	4.7 Kohms	± 10%	½ watt	Carbon
R17	1.2 Kohms	± 10%	½ watt	Carbon
R18	220ohms	± 5%	½ watt	High Stability
R19	220Kohms	± 10%	½ watt	Carbon
R20	1 Megohm	± 10%	½ watt	Carbon
R21	1 Kohm	± 10%	¼ watt	Carbon
R22	47 Kohms	± 5%	¼ watt	Carbon
R23	47 Kohms	± 5%	¼ watt	Carbon
R24	470Kohms	± 10%	½ watt	Carbon
R25	470Kohms	± 10%	½ watt	Carbon
R26	22 Kohms	± 10%	½ watt	Carbon
R27	22 Kohms	± 10%	½ watt	Carbon
R28	130 ohms	± 5%	1 watt	Carbon
R29	6.8Kohms	± 5%	½ watt	High Stability
R30	1 Kohms	± 5%	½ watt	High Stability
R31	1 Kohms	± 5%	½ watt	High Stability
R32	22 Kohms	± 10%	¼ watt	Carbon
R33	10 Kohms	± 10%	¼ watt	Carbon
R34	5.6 Kohms	± 10%	1 watt	Carbon
R35	470 ohms	± 10%	1 watt	Carbon
R36	2.2 ohms	± 10%	1 watt	Carbon
R37	1.8Mohms	± 5%	¼ watt	High Stability
R38	1.8Mohms	± 5%	¼ watt	High Stability
R39	1.5Mohms	± 10%	¼ watt	Carbon
R40	330Kohms	± 10%	¼ watt	Carbon
R41	220 ohms	± 10%	¼ watt	Carbon

CADET III STEREO AMPLIFIER (CASE MODEL)

COMPONENT VALUES

Capacitors.	Value.	Tolerance.	Rating.	Type.
C1	.022mfd	± 10%	400V	Polyester
C2	40mfd		16 V	Electrolytic
C3	0.1mfd	± 10%	400V	Polyester
C4	680pf	± 5%	160V	Polystyrene
C5	4700pf	± 5%	400V	Polystyrene
C6	100pf	± 5%	160V	Polystyrene
C7	1200pf	± 5%	125V	Polystyrene
C8	1500pf	± 5%	125V	Polystyrene
C9	0.1mfd	± 10%	400V	Polyester
C10	.047mfd	± 20%	160V	Polyester
C11	40mfd		16 V	Electrolytic
C12	.022mfd	± 10%	400V	Polyester
C13	1000pf	± 10%	160V	Polystyrene
C14	0.1mfd	± 10%	400V	Polyester
C15	0.1mfd	± 10%	400V	Polyester
C16	40mfd		16 V	Electrolytic
C17	6.8pf			Ceramic
C18	390pf	± 5%	160V	Polystyrene
C19	40mfd		16 V	Electrolytic
C20	125mfd		4 V	Electrolytic
C21	16mfd		350V	Electrolytic) Dual
C22	16mfd		350V	Electrolytic)
C23	24mfd		450V	Electrolytic) Dual
C24	24mfd		450V	Electrolytic)
C25	100mfd		275V	Electrolytic 700Mv Ripple
C26	100mfd		275V	Electrolytic 700Mv Ripple
C27	.022mfd		250V AC.	Polyester

Valves.

V1 a/b	ECC807
V2 a/b	ECC807
V3 a/b	ECC807
V4 a/b	ECL 86
V5 a/b	ECL 86

Potentiometer.

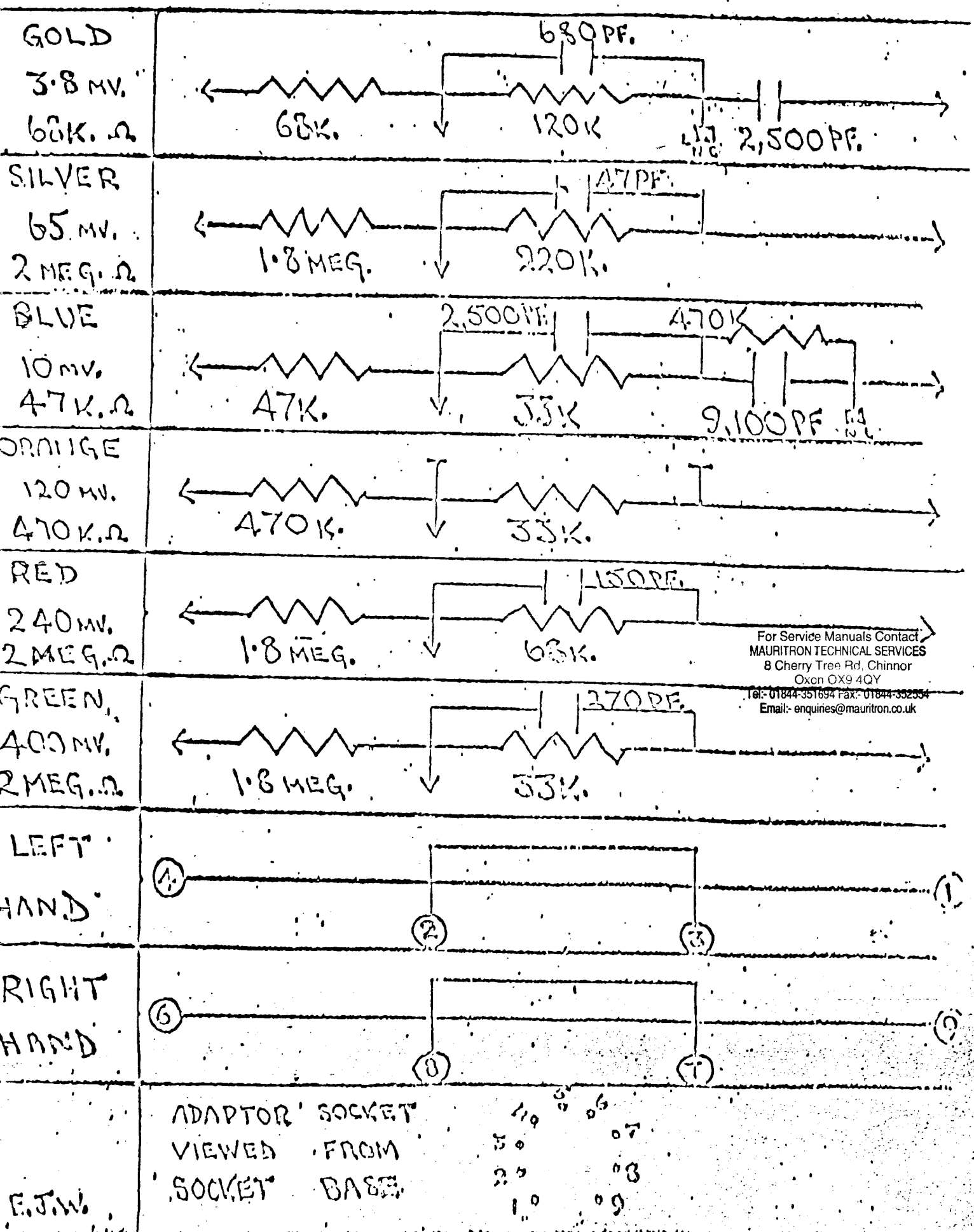
RV 1	Dual 1 Mohm	LIN	
RV 2	Dual 500 Kohm	LIN	Centre Tapped
RV 3	Dual 250 Kohm	LOG	+ Switch
RV 4	1 Kohm	LIN	

MR 1) Silicon Rectifier) DD 006 or
MR 2)) BY 114

F1 ½A 20MM glass Cartridge pattern Anti Surge
F2 1A 20MM glass Cartridge pattern Anti Surge
(100v 2 amp)

LP1 8v 1.2W. L.E5.

CADET MK III, & HG 88 MK III, P.U. ADAPTORS :



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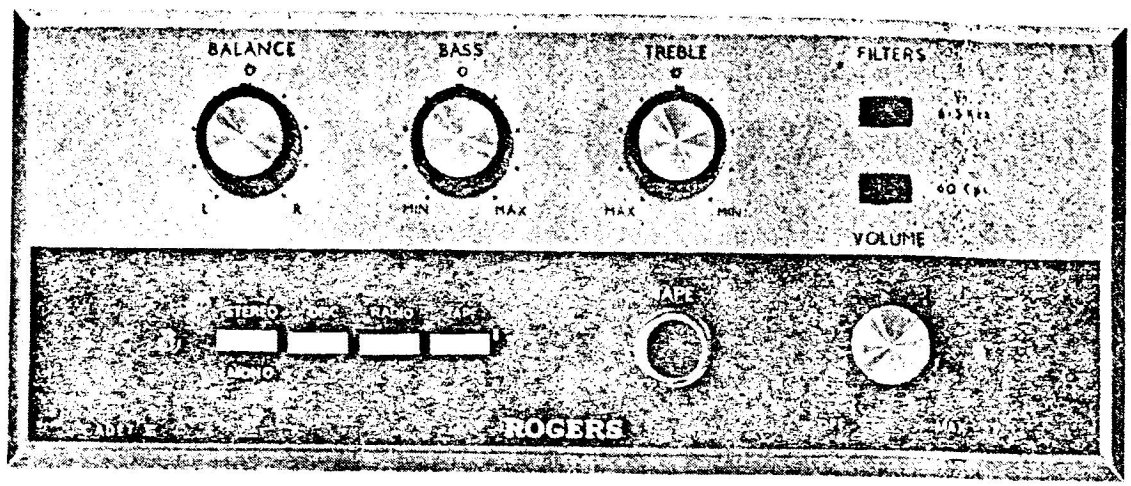
ROGERS CADET MARK THREE STEREO SYSTEM

Manufactured by Rogers Developments (Electronics) Ltd., Rodevco Works, 4-14, Barmeston Road, Catford, London, S.E.6.



In Dem. Room 141 at the 1958 Audio Fair Jim Rogers and colleagues delighted and surprised the high fidelity enthusiasts with some of the most musical sounds heard at that event. The prime mover was the RD Cadet amplifier and control unit introduced at that time. Since that date Rogers has produced a stereo control unit for the first model and then, in 1962, released the Cadet Mark II, which proved to be equally successful.

Now we have the Cadet Mark III, more sensitive and versatile than its predecessors, destined—we are certain—without donning the mantle of a prophet—for as great a success with those seeking an exceptional performance at a bargain price.

The attractive control unit, with its colour scheme of black and silver, measures (inclusive of panel) 11¼ by 4¾ by 4½in. It hasfour knobs, four push-buttons and two slide switches for control, a tape input/output socket and pilot lamp. The rear panel has phono sockets for disc, radio, tape in/out. The four knobs control balance, bass, treble and volume, with which last is ganged on the on/off switch. The four push buttons are the function selector switches and the two slide switches determine whether the high-pass and low-pass filters are switched in or out. The main amplifier (dimensions: 10 by 6½ by 4in.) is finished in grey and is connected to the control unit by means of a multi-cable terminated by a B9A plug.

The now familiar Rogers' method of construction is employed. The components are mounted on stand-off insulators, which easily and neatly permit the components to be connected to others on each side of the chassis. Polyester and polystyrene capacitors are fitted throughout, except of course, the decoupling and smoothing electrolytics. High stability resistors are used in the sections of the circuit demanding this type.

The high tension is derived from two BY.114 silicon rectifiers that supply feeds in the power amplifier, four ECL.86 valves (two in each channel arranged as push-pull output), split-load phase splitter, and audio-frequency amplifier. The output stage—for a change—is not ultra-linear connected. The control unit contains three of the new low-noise ECC.807 double-triodes, i.e. three triodes in each channel, used as first amplifier with negative feedback around it for characteristic correction, then another amplifier, and finally yet another amplifier having a modified Baxandall tone control circuit around it. This circuit also includes the high and low pass filters. The high tension has a 500mA. fuse in circuit, with the mains side of the power transformer fused with a 1 amp. anti-surge cartridge. Power output is substantially unaffected by output impedance matching and an improved output transformer (Hinchley) with better laminations and sectionalized windings offers superior power rating and response.

Following our normal procedure a collection of musical material was heard before conducting any measurements. Each item offered its own particular satisfaction to the panel of listeners—jazz, orchestral, chamber, organ or vocal—each was reproduced with superb overall balance, solid bass and clean crisp treble. The pre-amplifier/control unit has the facility, by means of plug-in adaptor units (with a bow of acknowledgment to the Quad designs), to cope with practically any leading pickup available today, including the low output magnetic models.

Our listening tests were made with high quality magnetics and ceramic designs providing the best results of which each model is capable. Bass and treble controls give good "shading" of the reproduced sound, and the balanced control moved the sound image smoothly from left to right. The low-pass filter made a distorted disc playable and the high-pass filter reduced to almost inaudible proportions deliberately introduced motor rumble. The low-pass filter starts its action at 6,500c/s. (10db. per octave) and the high-pass filter at 60c/s (10db per octave), in the printed spec.

The latest Cadet is normally supplied with two plug-in pickup matching adaptors, designated Gold and Silver. The colour-coded adaptors are, however, available in six types suitable, as already stated, for almost any pickup. The concise instruction booklet supplied gives a comprehensive list of the pickups that can be attached and the appropriate adaptor.

Now the test figures: as clipping of the waveform was just apparent on the oscilloscope at 10 watts, reduction to 9 watts (sine wave) produced a completely clean signal, and so our test figures refer to a level of 9 watts:

Power Response: within plus/minus 1db. from 35c/s. to 13,000c/s. and within plus/minus 2db. from 23c/s. to 25,000c/s.

Frequency Response: within plus/minus 0.5db. from 18c/s. to 19,000c/s. and within plus/minus 2db. from 15c/s. to 21,000c/s. The square-wave response was good between 80c/s. and 11,000 c/s. The phase-shift was from nil to 90 degrees through the pass-band.

Measured Negative Feedback: —14.5db.

Damping Factor: Approximately 5.2.

Channel Balance: Within 0.5db. of each other.

Channel Separation (Crosstalk): —48db. at 1,000c/s. —27db. at 10,000c/s.

Sensitivity:
Radio: 115mV.
Disc: 4mV (with Gold adaptor)
Disc: 86mV (with Silver adaptor)
Tape: 600mV.
The tape output socket gave an output of 600mV, for each of these inputs.

Treble Control: at 10,000c/s. from —16db. to +14db.

Bass Control: at 40c/s. from —14.5 db. to +12.5db.

Balance: a range of 9db.

Hum and Noise:
Radio: —61db.
Disc (Magnetic): —55db.
Disc (Ceramic): —52db.

Low Pass Filter: measured —10db. per octave from its starting point —6.5kc/s.

High Pass Filter: measured —13db per octave from its starting point —60c/s.

Disc Characteristics: Ceramic = Flat. Magnetic=within 0.5db. of the RIAA curve down to 100c/s, then within —2db. down to 40c/s.

SUMMARY: The delight and surprise evoked by the first model in 1958 has been repeated with this latest Rogers Mark III Cadet stereo system. How can they offer such a high standard of performance at this low price? This question so intrigued us that we sought some comments from Jim Rogers. He told us that, as far as possible, his company employ skilled labour as they have found —for instance—that a highly skilled wirer can complete a chassis in 40 per cent. of the time taken by a less skilled operator, but the wages paid are not, of course, in the same ratio. All the employees are fully occupied. 89 per cent. of components are machine-cut and formed to fit

directly on to the feed-through pin sub-chassis. All wires, tubes, and co-axial screened leads are cut and stripped on a high-speed automatic machine. The result of rigid wiring layout with pre-formed components and pre-cut wires, etc. is a very consistent standard of performance. A careful study of layout design, constructional techniques, etc. keeps production time down to a minimum.

All Rogers' chassis and metal work are made in their own factory and so it is possible to maintain a careful watch on quality control. Every component part used, right down to the smallest washer, has been purchased as a result of an intensive search of the British market for the lowest cost versus acceptable performance and reliability. (It must be remembered that every Rogers' product is guaranteed against faulty materials and workmanship for a period of *two* years.)

Bulk purchase is arranged where substantial savings are effected, for example, feed-through pins are bought in ¼ million lots. Wiring benches have been designed to give the worker comfortable uncramped working conditions with good lighting. Wire and component racks are carefully placed with special platforms and jigs provided for wiring sub-chassis in groups, where this results in speedier production. As this company's manufacture is concentrated on stereo equipment, Cossor dual-beam oscilloscopes are employed to speed up the test procedures.

This Cadet III is available in two versions, as indicated. The Integrated form is, in fact, the amplifier/control unit mounted in a case finished in Australian walnut formica. In this presentation it makes an admirable free-standing unit.

Tape facilities include a tape panel socket (5-pin DIN pattern) facilitating connection of complete portable tape machines. Connections, providing stereo record/replay, duplicated, at back of unit for built-in installations. Tape monitoring is possible with recorders fitted with a separate replay head by using the Tape button on the input selector.

One small point puzzles us in the design. Why does the treble control work in an exactly opposite direction from every tone control circuit so far encountered? It produces the cut in the clockwise direction and the boost in the anti-clockwise position.

The Cadet Mark III is a first-class performer of smart appearance, using valves, retailing at a price today that makes one think the manufacturer's costing department has nodded whilst doing its arithmetic.

F.R. and D.W.A.

ROGERS CADET III AMPLIFIER

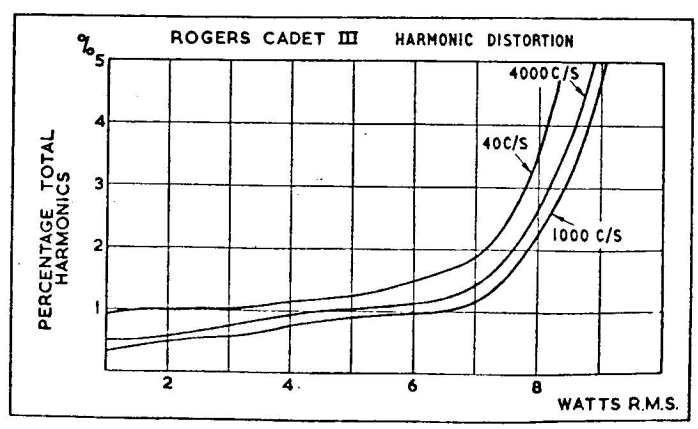
MANUFACTURER'S SPECIFICATION. Stereo amplifier and control unit available integrated or as separate units. **Power output:** 10 W per channel (sinewave), or 12½ W IHFM music power. **Power response:** 9 W ±1 dB, 40 c/s–10 Kc/s. **Frequency response (power amplifier):** 20 c/s–20 Kc/s ± ½ dB. **Harmonic distortion:** 0·25% at 5 W, 0·8% at 10 W (both at 1 Kc/s). **Intermodulation distortion:** 3% at 10 W (50 c/s and 6 Kc/s, 4 : 1). Negative feedback: 14½ dB. **Hum and noise (power amplifier):** 80 dB below 10 W. **Matching impedance:** 3–5 ohms and 12–16 ohms. **Power required:** 110–122–220–244 V, 50/60 c/s, 60 W. **Inputs:** Pickup (mag), 3·8 mV at 68 K; pickup (ceramic/crystal), 65 mV at 2 M; radio, 100 mV at 470 K; tape, 600 mV (25 dB overload capacity). **Frequency response (control unit):** 20 c/s–20 Kc/s ± 2 dB (controls level). **Signal-to-noise ratio (control unit):** Disc (mag), 54 dB; disc (ceramic), 52 dB; radio, 60 dB. **Crosstalk:** 42 dB at 1 Kc/s, 26 dB at 10 Kc/s. **Controls:** Bass, ±13½ dB at 40 c/s; treble, +13½ dB and −16 dB at 10 Kc/s; HP filter, 10 dB/octave/60 c/s; LP filter, 10 dB/octave/6·5 Kc/s; balance, 9 dB range. **Other features:** Magnetic and ceramic pickup input alternatives achieved by standard adaptors; output for feeding tape recorder, 600 mV. **Overall dimensions:** Main amplifier, 10 × 6½ × 4 in.; control unit, 10¾ × 4¾ × 4½ in. (chassis), 11½ × 4½ in. (front panel); integrated model in case, 12 × 10¾ × 5½ in. **Weight:** Main amplifier, 10 lb; control unit, 4 lb; integrated model, 17 lb.

Manufacturer: Rogers Developments (Electronics) Ltd., 4/14 Barmeston Road, Catford, London, S.E.6.

THE Rogers Cadet Mk. II—released early in 1963—was one of the first inexpensive amplifiers designed to take advantage of the Decca Deram pickup. It was—predictably—very successful, so much so that at one time there was a long waiting list. Now it has had a face-lift and some significant changes have been made in the circuitry, and so Mk. III makes its appearance. It is a little more expensive, but it has more power output, a switched low-pass filter, and most important—the sensitivity is high enough to suit low output magnetic pickups. The rumble or high-pass filter is retained, but the switch has been removed from the back and transferred to the front panel where it is more convenient. The styling has been changed, and whereas the older version tended to be rather squarish in form, this new design—to my eyes anyway—is a great improvement. The front panel is an aluminium pressing finished in black and silver, with plastic knobs trimmed to match. Amplifier and control unit are still 'separates' but a walnut-finished case which can hold both units is available if so desired.

PANEL ARRANGEMENT

The panel is divided into two sections with balance, treble and bass controls plus the two filter switches on the top, and the four-position press-button input switch and volume control at the bottom. The four positions are radio, gram., tape and stereo-mono. On the extreme right is a tiny indicator light, and a Continental DIN type tape recorder socket is located near the middle. This socket is somewhat unusual in that it provides for record *and* replay functions for both channels. Moreover, all these connections are duplicated by sockets at the rear of the control unit.



TECHNICAL REPORTS

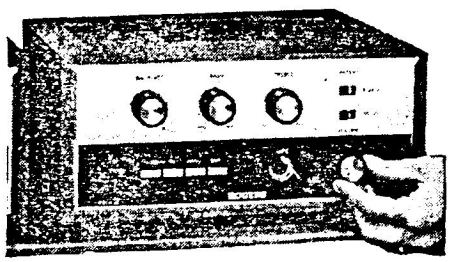
Rogers Cadet Mk. III Stereo Amplifier.

Manufactured by Rogers Developments (Electronics) Ltd., Rodevco Works, 4-14 Barmeston Road, Catford, London, S.E.6.

Makers' Specification:
Power output: 10 + 10 Watts (sine wave), 12.5 + 12.5 Watts IHFM. *Harmonic distortion:* 0.25% at 5 Watts, 0.8% at 10 Watts. *Frequency response:* ±0.5 dB 20-20,000 c/s. *Loudspeaker matching:* 3-5 and 12-16 Ohms. *Inputs:* magnetic and ceramic pickups (matching by plug-in adaptors) maximum sensitivity 2 mV, radio and tape. Baxandall bass and treble controls. Continental (DIN) tape socket on panel, provision for tape monitoring. *High and low pass filters:* 60 c/s and 6.5 Kc/s. *Styling:* two-tone grey with aluminium control panel anodised satin silver. *Case:* Australian walnut Formica. *Dimensions:* front panel 11¼ × 4¼ ins., case 12 × 10¾ × 5¼ ins. *Valves:* 4 of ECL 86, 3 of ECC 807. *Power supply:* 110-250 Volts AC 50-60 c/s.

I wonder if Mr. Rogers and his team felt any nostalgia as the first of these new Mark III Cadets came off the production line: for the familiar deep maroon paintwork, which had become almost a trade mark, is replaced now by two sharply contrasting shades of grey. More important perhaps, the heavily framed brushed brass panel, the outward sign of Rogers units for some years, has gone too and a simple and possibly rather delicate aluminium pressing finished in black and silver has taken over.

Looking at this model, one must agree that the new cosmetic has produced a visual improvement, but at the same time one might hesitate to approve the plastic surgery which has removed one of the few designs to resist the present fashion of a long low line. Indeed the control unit is deliberately longer than need be, for there is a substantial overlap at each end to accommodate the pickup adaptor and lead out wires. This is a practical disadvantage which might prevent the inclusion of a radio tuner in some cabinets. The integrated version is housed in an extremely plain walnut Formica case with a brown ventilation grille in the top surface.



Extension leads take the input connections from the control unit to an accessible position at the rear.

Setting appearance aside, what other changes distinguish the Mark III? Well, in the power amplifier section the answer is very little; and this is not due to any lack of enterprise on the designer's part, but merely because the Mark II was itself a peak of ingenuity in extracting the last ounce of performance for a given expenditure (see August 1962, page 125). Substitution of silicon rectifiers in a voltage doubling circuit in the power supply, together with the incorporation of somewhat improved output transformers, has raised the available power; but otherwise the circuit remains identical.

It is in the control unit one finds the improvements, one of them of major importance. So many people thought the performance of the older Cadet was worthy of the superior magnetic pickup cartridges that an equalised pre-amplifier was put on the market as an accessory. Now this facility has been built in by adding a further double triode to the two already in the pre-amplifier circuit. This is incidentally the first time we have come across the new ECC 807 low noise, double triode valves in a manufacturer's circuit.

Versatility in the connection of various pickup cartridges has been preserved by adopting the Quad technique of putting some of the pickup matching components into a plug-in adaptor. Two of these adaptors are provided, and four others are available. Other new features are the two slide switches to bring in fixed rumble and low pass filters, and the provision of a tape monitoring facility. This is achieved by the clever but simple ruse of divorcing the tape button from the latching mechanism so that it may be depressed independently of the other input selector buttons. As there are now many more recorders on the market which offer monitoring or low level replay outlets, it is nice to see it provided in this unobtrusive way. A 5-way DIN socket on the front panel gives record and replay stereo connections for operation with a tape recorder. Another possible new trend has not been catered for, and that is provision for stereo headphones; but one can easily add this.

Listening tests from various pickups and other sources produced the usual very musical sounds which enable the Rogers ensemble to present their annual high spot at the Audio Fair. If ever proof was needed that it is quite unnecessary to spend vast sums eliminating the last .000 . . . 1% of distortion, extending frequency response from one to a million c/s and incorporating negative feedback running into three figures, this is it, or rather another example of it. A selective ear which takes account of those things which actively degrade the music, which provides controls designed to assist its reproduction and ignores the expensive fads of fashion, this is the secret of Mr. Rogers' progress: and I am inclined to think it is worth more than all the instruments in the N.P.L. This amplifier cannot fail to be a success, for it offers exceptional value for money and there is not the slightest sign of skimping anywhere; including the printed instruction booklet.

Test measurements and notes

Frequency response, controls at level, radio input, ±0.5 dB between 100 and 10,000 c/s, ±1 dB between 30 and 20,000 c/s.

RIAA response, disc input (gold adaptor), within 1 dB above 80 c/s falling 2 dB at 50 c/s and 4 dB at 30 c/s.

Input sensitivities for maximum output, Disc (gold magnetic adaptor) 4.2 mV, Disc (silver ceramic adaptor) 78 mV, Radio 110 mV, Tape 620 mV (N.B. some tape recorders have less output).

Power output at onset of clipping, 10 Watts at 1 Kc/s when supply mains at maximum e.g., 250 volts applied to 240 volt tap; 8.5 Watts at nominal supply volts between 80 and 16,000 c/s, falling to 6 Watts at 50 and 20,000 c/s/

Distortion at 1 Kc/s at 6 Watts output 0.3%.

Negative feedback 14 dB; stability was very good as was the square wave pattern.

Range of tone controls, Bass at 50 c/s +12 to −15 dB, Treble at 10 Kc/s +12 to −17dB.

Low pass filter characteristic, −3 dB at 6.5 Kc/s, −6 dB at 9 Kc/s, −9 dB at 12 Kc/s.

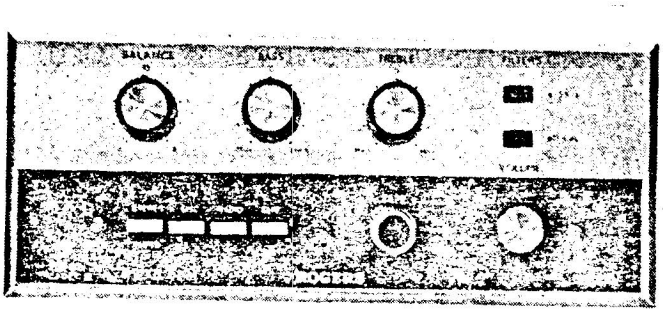
Rumble filter characteristic, −3 dB at 70 c/s, −6 db at 50 c/s, −9 dB at 45 c/s.

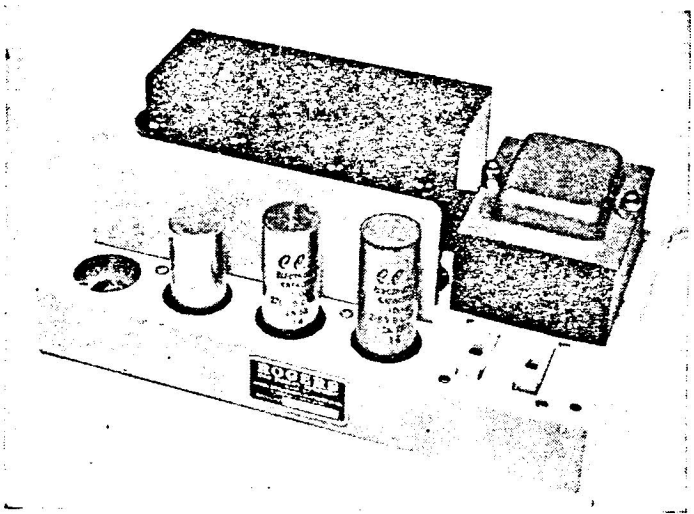
Range of balance control, 12 dB.

Signal to noise ratio, radio input 65 dB, disc input (magnetic) 44 dB.

Crosstalk, −44 dB at 1 Kc/s, −27 dB at 10 Kc/s.

GEOFFREY HORN.





When I unpacked the amplifier I must confess I was surprised not to see the familiar maroon finish long associated with Rogers' products, but no doubt we will get used to the change. The metalwork is now finished in grey and I half expected to see a printed circuit board underneath—but no, conformity has not gone this far and the components are mounted on miniature stand-off tags as before. Very neat and effective; in fact the workmanship as a whole is remarkably good—especially when the low price is taken into consideration.

Three special low-noise double-triodes (ECC807s) are used in the control unit—three triodes for each channel. All inputs are taken to the first triode with equalisation effected by a feedback loop connected between the grid of Triode 1 to the cathode of Triode 2. The balance control is also in this cathode circuit. The output from this stage is taken to a Baxandall tone control system and filter circuits using the third triode. Output is taken to the volume control, thence to the main amplifier. Five plug-in units are provided so that equalising and input impedances can be modified to suit various types of pickup, including low output ceramics, high output crystal, low output magnetic types, etc.

SIMPLE POWER AMPLIFIER

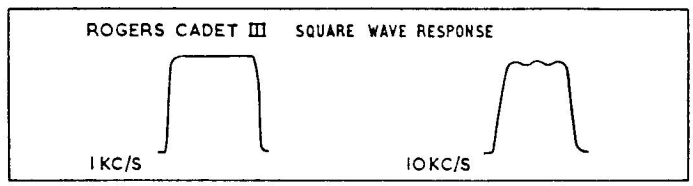
The main amplifier is very simple and straightforward as it uses only two triode-pentodes (type ECL86) for each channel. One triode forms an amplifier stage with the second triode functioning as an anode-cathode phase-splitter driving the pentode sections in a normal push-pull arrangement. Feedback is applied from the output transformer to the cathode of the triode. HT is derived from two metal rectifiers connected as voltage-doublers giving an HT rail of about 285 V. Compared with Mk. II, the circuit is basically similar but the HT has been increased and the results would indicate that the output transformers have been improved. As far as the control unit is concerned, an extra double-triode has been fitted to obtain the higher sensitivity.

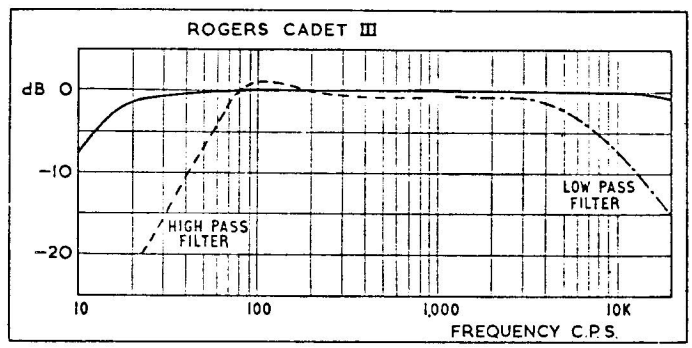
POWER OUTPUT

(per channel, both channels driven simultaneously)

Frequency c/s	30	40	100	1000	10,000	15,000	20,000
Watts (RMS)	6	7·2	7·8	8	8	7·8	6·3

Power was well maintained at both ends of the scale, the high frequency power being exceptionally good for an amplifier in this price class. No 'music power' figures were taken but they will be 20% higher than sine-wave power.





Frequency response was within 1 dB from 20 c/s to 20 Kc/s, rolling off from 50 Kc/s. The square wave definition was very good, with no trace of overshoot or appreciable ringing. The feedback loop measured 14 dB, and another 14 dB could be applied before instability became evident. Hum and noise varied between −50 dB and −62 dB (rel to 8 W) according to input and type of plug-in matching unit used. Crosstalk measured 43 dB at 1 Kc/s and 25 dB at 10 Kc/s. The bass control gave a lift of 12 dB and cut of 15 dB at 40 c/s and the treble a cut of 16½ dB and lift of 12 dB at 10 Kc/s. The characteristics of the filter are shown in the diagram and it will be seen that the −3 dB points are at 60 c/s and 6 Kc/s respectively. The balance control gave a total variation of 10½ dB and all the other controls were matched to within 1½ dB except at extremes.

EVEN BETTER VALUE

So much for the figures, but what about the actual performance? How does it compare with Mk. II? This was reviewed in February 1963 and I said it was excellent value for money. However, I must say right away that I consider the Mk. III is *even better* value and I am sure the Rogers' factory will be hard put to satisfy the demand. The extra power (some 25%) is very much worthwhile and it helps to give a reserve for handling transient peaks without distortion, besides coping with some of the smaller speaker systems which are relatively insensitive. The provision for magnetic pickups is another useful feature—although many people will find the better ceramic pickups satisfactory on most counts—including record wear. I found the low-pass filter quite efficient, and used in conjunction with the treble control is could deal with most kinds of distortion without losing too much of musical value in the process. I must admit the treble control itself was a little disconcerting because it operated in the reverse manner to the bass control—in other words, anti-clockwise rotation *lifted* treble instead of reducing it! This is only a minor criticism because, like the gear system of a new car, one would get used to it in time!

G. W. Tillett